

CLEAN AND RENEWABLE ENERGY ASSISTANCE APPROACHES USD 20 BILLION

Finance for renewables in developing countries is on the rise.

International financial flows to developing countries in support of clean and renewable energy reached USD 18.6 billion in 2016. This is almost double the level in 2010, when they first surged to USD 9.9 billion.

The Sustainable Development Goals (SDGs) adopted by the United Nations focus on four main targets for the global energy sector by 2030. Along with energy access, renewables and energy efficiency, there is a target to enhance international co-operation and promote investment in energy infrastructure and clean energy technology.

The formal indicator for that target is:

International financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems.

The International Renewable Energy Agency (IRENA) and the Organisation for Economic Co-operation and

Development (OECD) are the joint custodians for the indicator, which has been published for the first time this year. Despite recent fluctuations, annual investment flows could now be around USD 20 billion.

Figures for the indicator are also now part of IRENA's larger dataset on public financing, published every year since 2016. Unlike the data on total public investment in renewables, the international financial flows data excludes investments in developed countries and public funding of renewables from national agencies in developing countries (e.g. the Brazilian Development Bank, BNDES).

SDGs include a
target to enhance
international
co-operation

The new indicator comes from two main sources: the OECD Development Assistance Committee (DAC) database and non-DAC data collected by IRENA. The DAC database identifies the amount of overseas development assistance and other official flows committed to renewable energy each year by DAC members.

Non-DAC donors also invest in renewables. IRENA's data, for examples, includes rapidly growing investments funded by the China Ex-Im Bank and China Development Bank, which account for almost one-third of all funding since 2000.

Between 2000 and 2009, investment to developing countries for clean and renewable energy varied between USD 1 billion and USD 4 billion per year. The total flows increased to USD 9.9 billion in 2010 and have grown since then. Depending on the timing of large-scale investments in hydropower, these flows can vary considerably from year to year. However, the broad trend shows a ten-fold increase over the period from 2000 until 2016.

While hydropower has historically received the lion's share, investments in wind, geothermal and, especially, solar energy have grown significantly in the last few years.

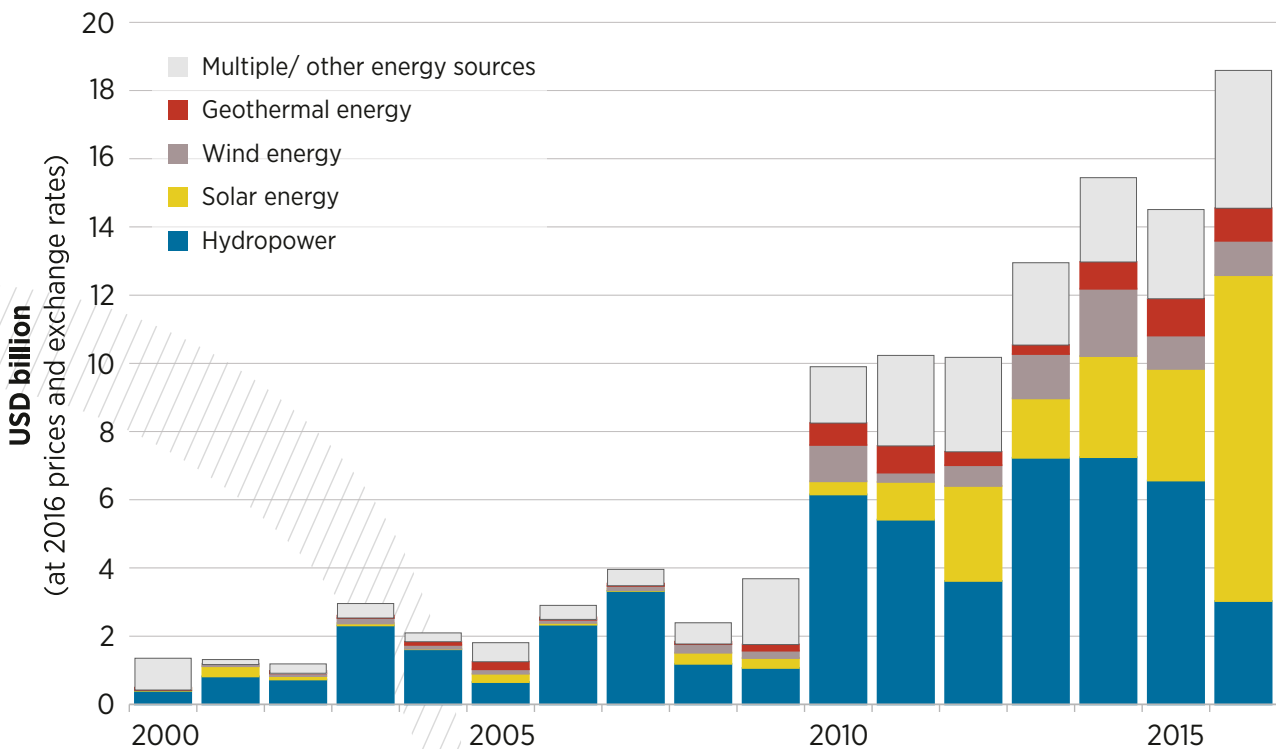
Investments in hydropower accounted for about 60% of international investment flows in renewables in the first decade. Flows to other technologies were generally small, with most projects focusing on providing technical assistance or supporting small-scale infrastructure developments.

Since 2009, the share of hydropower in total flows has fallen to 40%, while wind, geothermal and, especially, solar energy have gained ground. The scale of projects has also increased over the period, from an average of USD 10 million per project in 2000-2009 to USD 19 million in the last three years.

*For more, see **Renewable Energy Statistics 2019***

*To learn about new capacity additions being financed through the IRENA/ADFD Project Facility, see **Advancing Renewables in Developing Countries***

International financial flows to developing countries in support of clean and renewable energy



Source: OECD and IRENA.

Indian megacity starts to cut urban rail emissions

Since October 2017, the Delhi Metro has posted a steady rise in passenger figures, with nearly 2.7 million commuters taking the rapid transit network daily in the first quarter of 2018.

India's capital megacity needs to improve its transport system to cater for its growing population. Delhi's urban rail network last year had the sixteenth largest ridership among urban public transport systems worldwide. Recently, its operational length grew beyond 300 kilometres, making it the eighth longest metro system, with 250 stations. Operating such a system requires 700 million or more kilowatt-hours (kWh) of electricity each year.

But with abundant roof space on metro stations, the Delhi Metro Rail Corporation Ltd. (DMRC) sees the chance to use solar panels to lower its operating costs. Photovoltaic (PV) technology costs have fallen rapidly in recent years.

Solar PV is not only feasible but can even be profitable for metropolitan rail authorities

Traditionally, the DMRC purchased its electricity from distribution utilities for 6-7 Indian Rupees (INR), or nearly USD 0.09, per kWh. The price has historically increased by 3-5% each year over the last decade. In contrast, rooftop solar developers offer electricity at a flat rate of around INR 5-6/kWh for 25 years. Solar use, therefore, promises immense financial savings in the long-term.

Solar PV is not only feasible but can even be profitable for metropolitan rail authorities. Other co-benefits include job creation. A study found that DMRC could expect to create the equivalent of nearly 34 full time jobs per megawatt (MW) installed over the 25-year lifetime of a generic rooftop solar photovoltaic plant. The solar roof pilot project will also save 70 000 tonnes of carbon dioxide per year in greenhouse gas emissions once the planned 50 MW solar power capacity is in place.

The success of pilot interventions has inspired DMRC to formulate more ambitious future plans. As other large Indian cities design their own metro rail systems, some are considering Delhi's rooftop solar model.

The DMRC is India's first modern metro system. The government-owned rail network began operation in 2002.

*For more about urban energy solutions see: **Scaling up renewables in cities: Opportunities for municipal governments***



Photograph: Shutterstock



Photograph: Shutterstock

G20 countries key to climate mobilisation

The transformation of the global energy system to reduce carbon-dioxide (CO₂) emissions requires engagement at all levels of society – from communities, regions and governments to numerous stakeholders across the public and private sectors. The Group of Twenty (G20) economies, accounting for about four-fifths of the world's energy consumption, are crucial to mobilise meaningful action in time to avert catastrophic climate change.

Japan, holding the group's presidency this year, has encouraged leading political and technical institutions to examine decarbonisation potential in G20 countries. At mid-summer meetings in Japan,

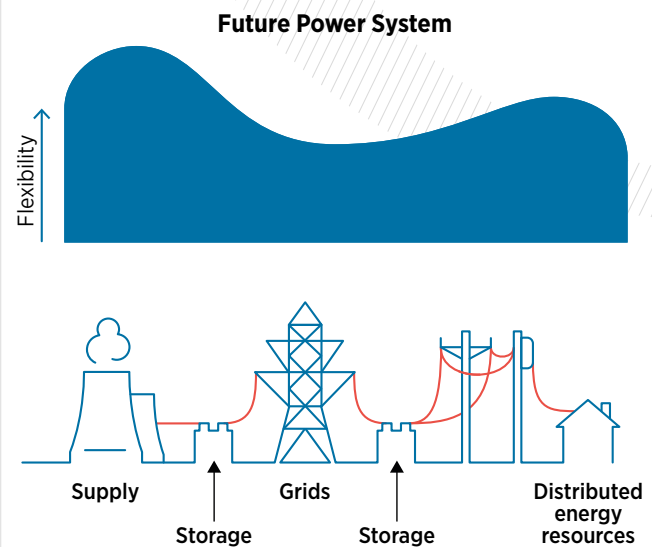
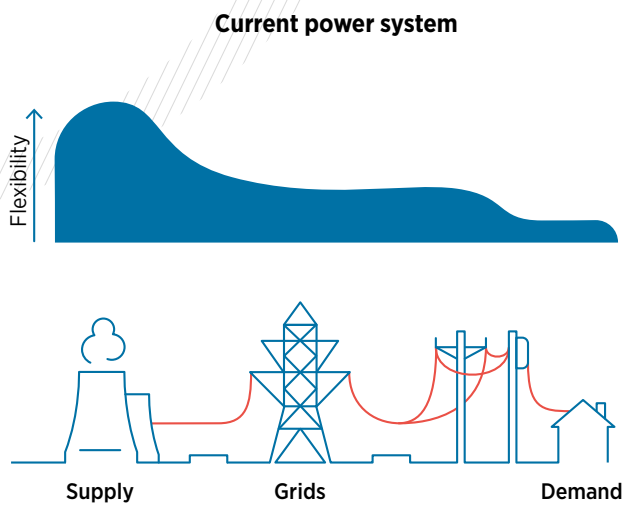
an Energy Transitions working group discussed grid flexibility to accommodate higher shares of solar and wind power, while a Climate Sustainability working group looked at the role of communities, cities and regions along with national policies to boost renewables.

G20 deliberations, like this year's major climate conferences, come amid a sense of growing alarm about emissions.

The special report from the Intergovernmental Panel on Climate Change (IPCC) in late 2018 underlined the growing impact of global warming, calling for urgent action. With two-thirds of greenhouse gas emissions originating from the energy sector, the IPCC has called for scaling up renewables and increasing energy efficiency immediately. Several global forums have developed action plans, both through the Sustainable Development Goals (SDGs) endorsed by the United Nations and through Nationally Determined Contributions (NDCs) under the Paris Agreement. Yet climate policies need to become more ambitious.

The IPCC special report underlines the growing impact of global warming

Innovation unlocks power sector flexibility



Around the world, electric power systems must become more flexible to reduce their climate impact. Smart systems allow for greater demand-side flexibility, which helps to make optimal use of solar and wind power. This is illustrated by the “camel curve” on the right side of the figure.

Ahead of the recent G20 discussions, IRENA provided reports on grid integration and the broad implications of the global energy transformation for climate and sustainability.

Renewables and energy efficiency offer a safe, reliable and affordable way to achieve massive decarbonisation, in line with keeping the rise in global temperatures “well below 2°C”. The combination of renewables, energy efficiency and increased electrification could achieve 90% of the reductions needed in energy-related emissions, IRENA’s analysis shows.

Along with preserving the environment, improving urban air quality, and protecting the world’s climate, the massive uptake of renewables and energy efficiency promises to bring financial and economic opportunities, wider prosperity and new jobs.

Energy and environment ministers gathered in Karuizawa, Japan, called on IRENA for further support on:

- » Integration of high shares of variable renewable energy;
- » Identification of innovative solutions for accelerating renewable energy and energy transitions;
- » Exploration of energy efficiency and renewable energy synergies;
- » Strategies for sustainable bioenergy.

IRENA has engaged with successive G20 presidencies since 2015 on a toolkit for renewable energy deployment. Increasingly, the organisation has aligned its G20 toolkit with the Paris Agreement and explored investment implications.

*For more see: **Climate change and renewable energy and Solutions to integrate high shares of variable renewable energy***



Photograph: Shutterstock

Latin America seeks common framework to boost renewables

Electricity consumption is projected to rise by about 70% across Latin America over the coming decade. Energy-intensive industries are growing and a rising middle class is buying more household appliances.

Since the late 2000s, countries up and down the expansive region have sought to plug their demand gap with renewables – and not just large hydropower dams. The region's investments in renewable power reached nearly USD 120 billion in 2010-2015, with several countries making the top ten globally.

Interest in renewables has gained a further boost amid high-profile climate meetings like August's Latin America & Caribbean Climate Week in Brazil and the year's biggest global climate discussion, COP25, coming up in Chile.

The region already derives 56% of its electricity from renewables, mostly large-scale hydropower and biomass. But countries are also scaling up solar, wind and geothermal power, which now account for some 37 gigawatts (GW) of installed capacity.

Accelerating Renewable Energy Deployment in Latin America

An action plan from IRENA, endorsed by Latin American countries in January 2019, aims at helping to overcome common barriers to investment in renewables. It provides a clear implementation framework for IRENA's support in Latin America in the near to medium term. Scaling up renewable energy can also catalyse job creation, drive economic growth and boost local industries.

Key areas for action on renewables include policy and regulation, project development and finance, long-term energy planning, power system flexibility, regional roadmaps and geothermal energy deployment. IRENA aims to work closely with national and regional stakeholders, as well as regional and international organisations, to put the plan into practice and accelerate the region's deployment of renewables.

The rise of non-hydro renewables promises resource complementarities that can improve power-system reliability in the long run. Solar and wind energy make the grid more resilient to climate change, potentially offsetting hydropower shortfalls in drought years, as well as reaching communities off the grid.

Yet the variability of solar and wind power requires increased system flexibility for large-scale use. Power system operators, especially within networks like the Central American Electrical Interconnection System (SIEPAC) need to be ready to adapt.

To learn more, see:

- » **Regional Action Plan: Accelerating Renewable Energy Deployment in Latin America**
- » **Plan de Acción Regional: Acelerando el Despliegue de Energía Renovable en América Latina**

A Latin American Innovation Day

Uruguay, a regional leader in deployment of renewables, hosted IRENA's first-ever regional Innovation Day in July. Held in partnership with the country's Ministry of Industry, Energy and Mining, and supported by Sweden's Ministry of Infrastructure and the Swedish Energy Agency, the event provided insights on installing renewable power, investing in cutting-edge systems and making optimal use of the latest technologies and business models.

Partnerships to pursue sustainable development

Leading United Nations agencies have pledged to co-operate with the International Renewable Energy Agency on crucial issues to ensure a sustainable global future.

Recent IRENA **co-operation agreements** include:

- » **United Nations Development Programme (UNDP)**, 17 June
- » **United Nations Framework Convention on Climate Change (UNFCCC)**, 20 July

MEMBER BULLETIN

Thailand adopts IRENA's power system roadmap

Faced with continually rising energy demand, Thailand is looking at ways to use more renewable energy. Amid growing reliance on costly fuel imports, the country's Ministry of Energy, aims to close the demand gap with clean, locally produced, climate-safe sources. In 2015 development plans, it set a target to cover 30% of energy consumption from renewables by 2036.

To confirm the feasibility of the target, the Thai authorities sought IRENA's advice. A country analysis based on IRENA's global renewable energy roadmap, or REmap, confirmed Thailand's potential to increase renewables more ambitiously, to 37% of overall energy consumption.

The country is now considering boosting its 2036 target for renewable power from just over 15% to a more substantial 25%. This compares to just 9% of Thailand's electric power today.

But scaling up solar and wind power requires more flexible system operation. Based on the REmap findings, the ministry asked IRENA to collaborate in a flexibility analysis of the national power system.

Thailand today has a high share of natural gas-fired capacity and low solar and wind capacity. The current plan calls for increasing solar and wind to 7.5 gigawatts by 2036. Increased shares of hydropower and biomass are also under consideration.

Encouragingly, IRENA's FlexTool analysis shows that the existing system, with realistic upgrades, would be flexible enough to accommodate the levels of renewables envisaged in the REmap scenario.

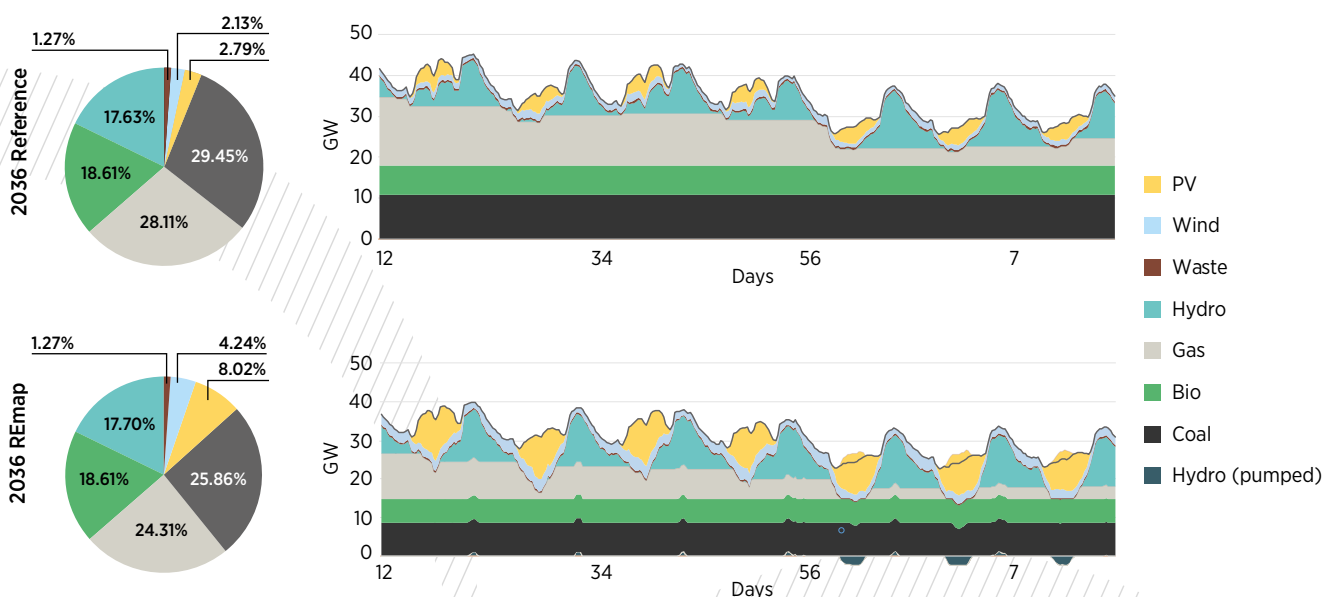
Energy storage and sector coupling – i.e. integrating buildings, heat and transport more closely with power production – would allow even greater use of renewables.

Thailand's Department of Alternative Energy Development and Efficiency (DEDE) welcomed the FlexTool findings. Higher-resolution grid analysis is now needed to take such plans further.

IRENA aims to extend its power system flexibility analysis across the Association of Southeast Asian Nations (ASEAN).

See the [country case study](#) for more details

Power generation (annual share) and hourly dispatch over the single week in 2036 with the highest solar and wind penetration



Recent publications



Renewable Energy and Jobs: Annual Review 2019

Employment opportunities are a key consideration in planning for low-carbon economic growth. Many governments have prioritised renewable energy development. This report covers employment opportunities up and down the supply chain of renewable energy adoption.



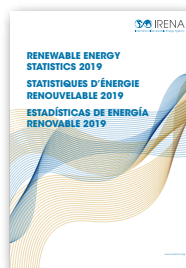
Renewable Power Generation Costs in 2018

Renewable energy has become an increasingly competitive way to meet new power generation needs. This comprehensive cost study from the IRENA highlights the latest trends for major renewable power technologies.



Renewable energy auctions: Status and trends beyond price

IRENA's latest research on auctions focuses on market developments in 2017 and 2018. Renewable energy auctions are increasingly used to achieve timely project completion, solar and wind integration, and supporting a just and inclusive energy transition.



Renewable Energy Statistics 2019

This statistics yearbook provides data sets on power generation capacity for 2009-2018, actual power generation for 2009-2017 and renewable energy balances for over 130 countries and areas for 2016-2017.

www.irena.org/publications

About IRENA

The International Renewable Energy Agency (IRENA) is an intergovernmental organisation that supports countries in their transition to a sustainable energy future and serves as the principal platform for international co-operation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy. IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy, in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity.

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